

SECTION 07550

MODIFIED BITUMEN BUILT-UP ROOFING

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and related services needed and install new roof insulation, Modified Bitumen High Performance Built up roof system in cold process, fascia and flashing, new drains with down spouts, miscellaneous caulking and damproofing necessary to satisfactorily complete the entire work.

1.2 DESCRIPTION

- A. All existing membrane, gravel, flashing materials shall be removed from the roof surface and properly disposed of. Concrete substrate shall be made clean and prepared for application of roof insulation. Include/execute necessary substrate deck repairs as instructed by the authorized MBTA personnel.
- B. Set a single layer of 3" Polyisocyanurate insulation into ribbons of insulation adhesive per these specifications. Set a single layer of ½" asphalt covered High Density fiberboard into ribbons of insulation adhesive per these specifications.
- C. Install two plies of specified base sheets into modified cold adhesive. Install a high performance Styrene-Butadiene-Styrene and Styrene-Isoprene-Styrene and Ethylene Styrene rubber modified membrane with tensile strengths of no less than 700 pounds per inch in the machine and cross machine direction and tear strength of no less than 1,300 pounds per square inch in the machine and cross machine direction. The membrane shall have a dual fiberglass and polyester scrim for strength and heat stability along with the ability to conform. It should be finished with a flood coat of modified cold adhesive and gravel for foot traffic and UV protection.
- D. Base flashing system shall be installed at all projections and perimeters using a 2 ply flashing system. The first ply shall be specified base sheet in trowel grade modified cold adhesive. The top ply shall be 115 mil thick SBS, SIS, and ES Modified Bitumen membrane with a polyester-fiberglass scrim set in trowel grade modified cold adhesive.
- E. Remove and replace existing roof drains. New Smith 10 10-R-C-CID drains, or equal, shall be installed. Drain diameter shall be determined by diameter of existing drain openings. All drain bowls shall be insulated. The contractor shall be responsible to provide all drain accessories. All drains jetted/cleared to 100ft outside of

F. Miscellaneous flashing, caulking and accessories shall be installed.

G. New metal shall be installed at all projections and drains.

- A. Section 07590 - Preparation for Re-roofing.
- B. Section 07220 - Roof and Deck Insulation.
- C. Section 07600 - Flashing and Sheet Metal.

- A. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7-98, Minimum Design Loads for Buildings and Other Structures.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM D41-94, Specification for Asphalt Primer Used in Roofing, Dampproofing and Waterproofing.
 - 2. ASTM D312-00, Specification for Asphalt Used in Roofing.
 - 3. ASTM D451-91, Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products.
 - 4. ASTM D1079-01, Terminology Relating to Roofing, Waterproofing and Bituminous Materials.
 - 5. ASTM D1227-95, Specification for Emulsified Asphalt Used as a Protective Coating for Roofing.
 - 6. ASTM D1863-93, Specification for Mineral Aggregate Used as a Protective Coating for Roofing.
 - 7. ASTM D2178-97a, Specification for Asphalt Glass Felt Used as a Protective Coating for Roofing.
 - 8. ASTM D2822-91, Specification for Asphalt Roof Cement.
 - 9. ASTM D2824-02, Specification for Aluminum-Pigmented Asphalt Roof Coating.
 - 10. ASTM D4601-98, Specification for Asphalt Coated Glass Fiber Base Sheet Used in Roofing.
 - 11. ASTM D5147-01a, Test Method for Sampling and Testing Modified Bituminous Sheet Materials.
 - 12. ASTM D6162-0a, Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
 - 13. ASTM D6163-00, Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.
 - 14. ASTM E108-00, Test Methods for Fire Test of Roof Coverings.
- C. National Roofing Contractors Association (NRCA):
 - 1. Roofing and Waterproofing Manual.

CONTRACT NO.	MODIFIED BITUMEN BUILT-UP ROOFING	MBTA
YEAR	07550-2	REV 09/07

- A. It is the intent of this specification to install a long-term, quality roof system that meets or exceeds all current NRCA guidelines as stated in the most recent edition of the NRCA Roofing and Waterproofing Manual.

1.6 SUBMITTALS

- A. Product Data: Provide manufacturer's technical product data for each type of roofing product specified. Include data substantiating that materials comply with specified requirements.
- B. Samples: Submit two (2) samples of each product specified.
- C. Manufacturer's Installation Instructions: Submit installation instructions and recommendations indicating special precautions required for installing the membrane.
- D. Manufacturer's Certificate: Certify that roof system furnished is approved by Factory Mutual in accordance with ASTM E108, Class [A] for external fire and meets local or nationally recognized building codes.
- E. Manufacturer's Certificate: Certify that the roof system is adhered properly to meet or exceed the requirements of FM [1-90].
- F. Manufacturer's Certificate: Certify that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- G. Manufacturer's Certificate: Submit a certified copy of the roofing manufacturer's ISO 9001 compliance certificate.
- H. Test Reports: Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147.
- I. Submit a copy of an unexecuted manufacturer's warranty for review.
- J. Manufacturer providing warranty will submit a brief description of training program for job-site monitors. It will include a list of five (5) completed projects and contact information for reference.
- K. Submit a sample of roofing aggregate for review.

1.7 QUALIFICATIONS

- A. Manufacturer of the modified bitumen roof membrane shall have a minimum [10] years experience in the manufacturing of modified bitumen roof membranes and have ISO 9001 certification.
- B. Installer: Company specializing in modified bituminous roofing installation with a minimum [5] years experience and certified by roofing system manufacturer as qualified to install manufacturer's

roofing materials.

- C. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work and at any time roofing work is in progress. Maintain proper supervision of workmen. Maintain a copy of the specifications in the possession of the Supervisor/Foremen and on the roof at all times.
- D. Immediately corrects roof leakage during construction. If the Contractor does not respond within twenty four (24) hours, the Owner has the right to hire a qualified contractor and back-charge the original contractor.
- E. Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.8 PRE-INSTALLATION CONFERENCE

- A. Pre-Roofing Conference: Convene a pre-roofing conference approximately two (2) weeks before scheduled commencement of modified bituminous roofing system installation and associated work.
- B. Require attendance of installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of rooftop units and other work in and around roofing which must precede or follow roofing work (including mechanical work if any), Architect, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of the Work, including (where applicable) Owner's insurers, testing agencies and governing authorities.
- C. Objectives of conference to include:
 - 1. Review foreseeable methods and procedures related to roofing work.
 - 2. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by others.
 - 3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
 - 4. Review roofing system requirements (drawings, specifications and other contract documents).
 - 5. Review required submittals both completed and yet to be completed.
 - 6. Review and finalize construction schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
 - 7. Review required inspection, testing, certifying and material

- usage accounting procedures.
8. Review weather and forecasted weather conditions and procedures for inclement conditions.
 9. Record discussion of conference including decisions and agreements (or disagreements) reached and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.
 10. Review notification procedures for weather or non-working days.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site with seals and labels intact, in manufacturer's original containers, dry and undamaged.
- B. Store and handle roofing sheets in a dry, well-ventilated, weather-tight place to ensure no possibility of significant moisture exposure. Store rolls of felt and other sheet materials on pallets or other raised surface. Stand all roll materials on end. Cover roll goods with a canvas tarpaulin or other breathable material (not polyethylene).
- C. Do not leave unused materials on the roof overnight or when roofing work is not in progress unless protected from weather and other moisture sources.
- D. It is the responsibility of the contractor to secure all material and equipment on the job site. If any material or equipment is stored on the roof, the contractor must make sure that the integrity of the deck is not compromised at any time. Damage to the deck caused by the contractor will be the sole responsibility of the contractor and will be repaired or replaced at his expense.

1.10 MANUFACTURER'S INSPECTIONS

- A. When the project is in progress, the roofing system manufacturer will provide the following:
 - 1. Keep the Engineer informed as to the progress and quality of the work as observed.
 - 2. Provide daily job site inspections including documented weekly progress reports including photos.
 - 3. Report to the Engineer in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
 - 4. Confirm after completion that manufacturer has observed no applications procedures in conflict with the specifications other than those that may have been previously reported
 - 4. The presence of the manufacturer's representative shall in no way be construed as the manufacturer or the representative as having any responsibility or oversight of the contractor's employees for safety issues. The sole purpose of the manufacturer's representative is to ensure the specified materials are applied in a manner consistent with this specification.

1.11 PROJECT CONDITIONS

- A. Weather Condition Limitations: Do not apply roofing membrane during inclement weather or when a 40% chance of precipitation is expected.
- B. Do not apply roofing insulation or membrane to damp deck surface.
- C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

1.12 SEQUENCING AND SCHEDULING

- A. Sequence installation of modified bituminous sheet roofing with related units of work specified in other sections to ensure that roof assemblies including roof accessories, flashing, trim and joint sealers are protected against damage from effects of weather, corrosion and adjacent construction activity.
- B. Fully complete all modified bituminous membrane roofing field assembly work each day. Phased construction will not be accepted.

1.13 WARRANTY

- A. Upon completion of installation, and acceptance by the Owner and Architect, the manufacturer will supply to the Owner a 20-year NDL (No dollar limit) warranty.
- B. Installer will submit a minimum of a two (2) year warranty to the membrane manufacturer with a copy directly to Owner.
- C. Membrane manufacturer will provide an annual inspection for the life of the warranty. Follow up inspections to include photographs and written report.

1.14 PRODUCT OPTIONS AND SUBSTITUTIONS

- A. Any material submitted as an equal to the specified material must include a list of three (3) projects where the proposed material has been used in a similar roofing system as that which is specified and is located within a one hundred mile radius from the location of the project. In addition, the three projects must be at least three (3) years old and be available for inspection by the Architect, Owner or Owner's Representative.
- B. Any deficiencies in performance, warranty terms or improper submittal procedure will constitute grounds for immediate rejection of substitution.
- C. Single ply EPDM and or PVC roof membrane system as well as two ply modified bitumen roof membrane systems will not be considered as equals to the specified system and will be immediately rejected.
- D. No modified bitumen membrane will be considered unless it can meet or exceed the performance characteristics described in section 2.4 of the project manual

PART 2 - PRODUCTS

2.1 PERFORMANCE STANDARD

- A. When a performance standard is specified it shall be indicative of a standard required.
- B. Any item or materials submitted as a substitution to the performance specified must comply in all respects as to the quality and performance specified. The Engineer shall be the sole judge as to whether or not an item submitted as a substitute is truly equal. Should the Contractor choose to submit a substitute product, he shall assume all monetary or other risk involved, should the Engineer find the substitution unacceptable.
- C. The Authority is concerned about quality performance in all areas of roofing construction and as a result is requiring the sourcing of all cold adhesives, ply sheets, flashing materials and related items to be manufactured by a single Roofing Materials manufacturer in order to ensure consistent quality.

2.2 DESCRIPTION

- A. Modified bituminous roofing work including but not limited to:
 - 1. Two plies of approved ASTM D-4601 Type II base sheet.
 - 2. Cold Bitumen: The standard bitumen will consist of a V.O.C. compliant, non-Asbestos containing cold applied adhesive for roof slopes up to 3:12.
Performance Requirements:
 - 1. Non-Volatile Content ASTM D-4479 75%
 - 2. Density ASTM D-1475 8.25 lb./gal.
 - 3. Viscosity Brookfield RVT;
 - 4. Spindle #5; 10RPM 77°F (25°C)15,000-20,000cP
 - 5. V.O.C. ASTM D-3960 300 g/l max.
 - 6. Viscosity Stormer ASTM D-562 600-1000 grams
 - 7. Flash Point ASTM D-93 100°F
 - 3. Base Flashing Ply: Will be one ply of approved ASTM D-4601 Type II base sheet bonded to the prepared substrate with bitumen.
 - 4. Modified Membrane/Top Flashing Ply: 115 mil SBS and SIS and ES (Stryrene-Butadiene-Styrene and Styrene-Isoprene-Styrene and Ethylene-Styrene) rubber modified membrane incorporating post consumer recycled rubber and reinforced with a super strong fiberglass and polyester composite scrim.
 - 5. Surfacing: Flood coat of modified cold adhesive and ASTM D1863 roofing aggregate consisting of pea gravel.
 - 6. Insulation Adhesive
Performance Requirements:
 - 1. Tensile Strength (ASTM D-412-92).... 250 psi
 - 2. Density (ASTM D-1875-90) 8.5 lbs/gal
 - 3. Viscosity (ASTM D-2556-93a)..... 2,000-60,000 cP
 - 4. Peel Strength (ASTM D-903)17 lb/in
 - 5. Flexibility (ASTM D-816-12) Pass @ -70°F

2.3 BITUMINOUS MATERIALS

- A. Asphalt Primer: V.O.C. compliant, ASTM D41.
- B. Asphalt Roofing Mastic: V.O.C. compliant, ASTM D2822, Type II.
- C. Standard Cold Applied Membrane Adhesive: V.O.C. compliant ASTM D-3019.
- Performance Requirements:
1. Non-Volatile Content ASTM D-4479 75%
 2. Density ASTM D-1475 8.25 lb./gal.
 3. Viscosity Brookfield RVT;
 4. Spindle #5; 10RPM 77°F (25°C)15,000-20,000cP
 5. V.O.C. ASTM D-3960 300 g/l max.
 6. Viscosity Stormer ASTM D-562 600-1000 grams
 7. Flash Point ASTM D-93 100°F
- D. Brush Grade Flashing Adhesive
- Performance Requirements:
1. Non-Volatile Content ASTM D-4479 70 min.
 2. Density ASTM D-1475 8.6 lb./gal.
 3. V.O.C. ASTM D-3960 295 g/l max.
 4. Flash Point ASTM D-93 100°F

2.4 SHEET MATERIALS

- A. Type II Base Sheet:

MEETS AND/OR EXCEEDS ASTM D-4601, TYPE II,
Tensile Strength at Maximum Load* (ASTM D-146)
2 in/min @ 73.4 °F MD 100 lbf/in. CMD 80
lbf/in.

(50 mm/min @ 23 °C)(MD 17.5 kN/m) (CMD 14.0
kN/m)

Minimum Weight35 lb/100ft² (1.71 kg/m²)
Mass of Uncoated Glass Mat 2.4 lb/100 ft² (117 g/m²)
Pliability at 77°F (25°C), 1/2 in. (12.7 mm) radius no cracks

- B. Modified Membrane Properties/Top Modified Flashing Ply:

1. ASTM D-6162, Type III Grade S minimum performance characteristics.

Tensile Strength (ASTM D-5147)
2 in/min. @ 73.4 °F MD 700 lbf/in CMD 750
lbf/in

Tear Strength (ASTM D-5147)
2 in/min. @ 73.4 °F MD 1300 lbf CMD 1400 lbf

Elongation at Maximum Tensile (ASTM D-5147)
2 in/min. @ 73.4 °F

MD 6%

CMD 6%

Low Temperature Flexibility (ASTM D-5147)
34°C)

Passes -30°F (-

2.5 SURFACINGS

- A. Aluminizer for exposed flashings

Flash Point 103°F (39°C) min.
Weight/Gallon 7.9 lbs/gal. (1.0 g/cm³)

- B. Aggregate: To conform to ASTM D-1863.

Pea Gravel

2.6 RELATED MATERIALS

- A. Roof Insulation: In accordance with Section 07220.

- B. Single-component insulation adhesive meeting or exceeding the performance requirements provided below

Performance Requirements:

1. Tensile Strength (ASTM D-412-92).... 250 psi
2. Density (ASTM D-1875-90) 8.5 lbs/gal
3. Viscosity (ASTM D-2556-93a)..... 2,000-60,000 cP
4. Peel Strength (ASTM D-903)17 lb/in
5. Flexibility (ASTM D-816-12) Pass @ -70°F

- C. Nails and Fasteners: Non-ferrous metal or galvanized steel, except that hard copper nails shall be used with copper; aluminum or stainless steel nails shall be used with aluminum; and stainless steel nails shall be used with stainless steel. Fasteners shall be self-clinching type of penetrating type as recommended by the manufacturer of the deck material. Nails and fasteners shall be flush-driven through flat metal discs of not less than one (1) inch diameter. Omit metal discs when one-piece composite nails or fasteners with heads not less than one (1) inch diameter are used.

- D. Metal Discs: Flat discs or caps of zinc-coated sheet metal not lighter than twenty eight (28) gauge and not less than one (1) inch in diameter. Form discs to prevent dishing. Bell or cup shaped caps are not acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that deck surfaces and project conditions are ready to receive work of this section.
- B. Verify that deck is supported and secured to structural members.
- C. Verify that deck is clean and smooth, free of depressions, projections or ripples, and is properly sloped to drains.
- D. Verify that adjacent roof members do not vary more than [1/4] inch in height.
- E. Verify that deck surfaces are dry [and free of snow or ice].
- F. Confirm that moisture content does not exceed [twelve (12)] percent by moisture meter tests.
- G. Verify that openings, curbs, pipes, conduit, sleeves, ducts, and other items, which penetrate the roof, are set solidly, and that wood cant strips and wood nailing strips are set in place.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing the roof system
- B. Insurance/Code Compliance: Where required by code, install and test the roofing system to comply with governing regulation and specified insurance requirements.
- C. Protect other work from spillage of roofing materials and prevent materials from entering or clogging drains and conductors. Replace or restore other work damaged by installation of the modified bituminous roofing system.
- D. Coordinate installing roofing system components so that insulation and roofing plies are not exposed to precipitation or left exposed overnight. Provide cut-offs at end of each day's work to cover exposed ply sheets and insulation with two (2) plies of #15 organic roofing felt with joints and edges sealed with roofing cement. Remove cut-offs immediately before resuming work.
- E. Cold applied membrane adhesive coverage rates for interply application (2)
 5 two gallons per 100 square feet (plus or minus 25% on total job average basis.)
- F. Substrate Joint Penetrations: Prevent bitumen from penetrating substrate joints or damaging roofing system components.
- G. Apply roofing materials as specified by manufacturer's instructions.

1. Keep roofing materials dry before and during application.
 2. Do not permit phased construction.
 3. Complete application of roofing plies, modified sheet and flashing in a continuous operation.
 4. Begin and apply only as much roofing in one day as can be completed that same day.
- H. Cut-Offs (Waterstops): At end of each day's roofing installation, protect exposed edge of incomplete work, including ply sheets and insulation. Provide temporary covering of two (2) plies of #15 organic roofing felt set in flashing adhesive.

3.4 BASE PLY INSTALLATION

- A. Base Plies: Install (2) two base sheets in 2 gallons per ply per square of bitumen shingled uniformly to achieve two plies throughout over the prepared substrate. Shingle in proper direction to shed water on each large area of roofing. Prior to installation, cut sheets into 18' lengths and allow to relax.
- B. Lap ply sheet ends eight (8) inches. Stagger end laps twelve (12) inches minimum.
- C. Lightly broom in base plies to assure complete adhesion.
- D. Extend plies two (2) inches beyond top edges of cants at wall and roof projections and equipment bases.
- E. Install base flashing ply to all perimeter and projection details.
- F. Allow the two plies of base sheet to cure at least thirty minutes before installing the modified membrane. However, the modified membrane must be installed the same day as the base plies.

3.5 MODIFIED MEMBRANE APPLICATION

- A. The modified membrane shall then be solidly bonded to the base layers with specified cold adhesive at the rate of 2 gallons per 100 square feet. Two hours prior to installation, cut sheets into 18' lengths and allow to relax.
- B. The modified membrane roll must push a puddle of asphalt in front of it with asphalt slightly visible at all side laps. Exercise care during application to eliminate air entrapment under the membrane.
- C. Subsequent rolls of modified shall be installed across the roof as above with a minimum of 4" side laps and 8" end laps. The end laps shall be staggered. The modified membrane shall be laid in the same direction as the underlayers but the laps shall not coincide with the laps of the base layers.
- D. For best results, allow the cold adhesive to set for five to ten minutes before installing the top layer of modified membrane.
- E. Extend membrane 2" beyond top edge of all cants in full moppings of the cold adhesive as shown on the drawings.

3.6 FLASHING MEMBRANE INSTALLATION

- A. Seal all curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
- B. Prepare all walls, penetrations, expansion joints [and where shown on the drawings] to be flashed with asphalt primer at the rate of one hundred (100) square feet per gallon. Allow primer to dry tack free.
- C. Install pressure treated wood nailers on the existing parapet wall to prepare for installation of new coping caps.
- D. Use the modified membrane as the flashing membrane. Adhere to the underlying base flashing ply with specified asphalt unless otherwise noted in these specifications. Nail off at a minimum of eight (8) inches o.c. from the finished roof at all vertical surfaces.
- E. Solidly adhere the entire sheet of flashing membrane to the substrate.
- F. Seal all vertical laps of flashing membrane with a three-course application of trowel-grade mastic and fiberglass mesh.
- G. Coordinate counter flashing, cap flashings, expansion joints, and similar work with modified bitumen roofing work as specified in other sections.

- H. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work as specified in other sections.

I. Metal Roof Edge [Detail No. MBC-10]

1. Inspect the nailer to assure proper attachment and configuration.
2. Run all plies over the edge. Assure coverage of all wood nailers. Fasten plies with ring shank nails 8" O.C.
3. Install continuous cleat, fasten 6" O.C.
4. Install new metal edge hooked to continuous cleat and set in bed of roof cement. Fasten flange to wood nailer every 3" O.C. staggered.
5. Prime metal edge at a rate of 100 square feet per gallon and allow to dry.
6. Strip in flange with base flashing ply covering entire flange with 6" on to the field of roof in Flashing Mastic. Assure ply laps do not coincide with metal laps.
7. The second ply shall be a modified flashing ply installed over the base-flashing ply, 9" on to field of roof in Flashing Mastic or.

J. Roof Drain [Detail No. MBC-40]

1. Plug drain to prevent debris from entering plumbing.
2. Taper insulation to drain minimum of 8' from center of drain.
3. Run roof system plies over drain. Cut out plies inside drain bowl.
4. Set lead/copper flashing (30" square minimum) in 1/4" bed of mastic.
Run lead/copper into drain a minimum of 2". Prime lead/copper at a rate of 100 square feet per gallon and allow to dry.
5. Install base flashing ply (40" square minimum) in Flashing Mastic.
6. Install modified membrane (48" square minimum) in Flashing Mastic.
7. Install clamping ring and assure all plies are under the clamping ring.
8. Remove drain plug and install strainer.

K. Plumbing Stack [Detail No. MBC-50]

1. Minimum stack height is 18 to 24".
2. Run roof system over the roof. Seal the base of the stack with elastomeric sealant.
3. Prime flange of new sleeve. Install properly sized sleeves set in 1/4" bed of roof cement.
4. Install base flashing ply in Flashing Mastic.

5. Install modified membrane in Flashing Mastic.
6. Caulk the intersection of the membrane with elastomeric sealant.
7. Turn sleeve a minimum of 1" down inside of stack.

3.7 APPLICATION OF SURFACING

- A. Aggregate Surfacing
 1. Apply surfacing materials in the quantities specified (4 gal. per square) after felt flashings, tests, repairs and corrective actions have been completed and approved. Uniformly embed aggregate in a flood coat of cold adhesive at a rate of 500 lbs. per square for aggregate or 400 lbs. per square for slag.
 2. Aggregate shall be dry and placed in a manner required to form a compact, embedded overlay. To aid in proper embodiment, aggregate may be lightly rolled provided that there is not damage to the modified built-up roofing membrane.
- B. Aluminum Coating: (Over Flashing Membrane Only)
 1. Allow all cold applied mastics and coating to properly dry and cure before installing the aluminum coating.

2. Brush apply glass fibered asphalt emulsion at a rate of five (5) gallons per one hundred (100) square feet. Paint all exposed membrane with manufacturer's aluminum coating installed at a rate of one half (½) gallon per square per coat. This shall be a one-coat application with the finished stroke in one direction.
3. Paint all exposed membrane with manufacturer's non-fibrated aluminum paint installed at a rate of one-half gallon per square per coat. This shall be a two-coat application with the finished stroke in one direction.

3.8 FIELD QUALITY CONTROL

- A. Perform field inspection and [and testing] as required.
- B. Correct defects or irregularities discovered during field inspection.
- C. Require attendance of roofing [and insulation] materials manufacturers' representatives at site during installation of the roofing system.

3.9 CLEANING

- A. Remove bitumen adhesive drippings from all walls, windows, floors, ladders and finished surfaces.
- B. In areas where finished surfaces are soiled by asphalt or any other sources of soiling caused by work of this section, consult manufacturer of surfaces for cleaning instructions and conform to their instructions.
- C. Repair or replace defaced or disfigured finishes caused by work of this section.

3.10 FINAL INSPECTION

- A. At completion of roofing installation and associated work, meet with Contractor, Architect, installer, installer of associated work, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of roofing system.
- B. Walk roof surface areas of the building, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.
- C. The roofing system manufacturer reserves the right to request a thermographic scan of the roof during final inspection to determine if any damp or wet materials have been installed. The thermographic scan shall be provided by the [Roofing] Contractor.

- D. If core cuts verify the presence of damp or wet materials, the [Roofing] Contractor shall be required to replace the damaged areas at his own expense.
- E. Repair or replace deteriorated or defective work found at time above inspection as required to produce an installation which is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- F. Notify the Architect and Owner upon completion of corrections.
- G. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

PART IV - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

- A. Modified Bitumen Built-up Roofing including inner ply, cap sheet, flood and gravel protection, all adhesives and associated preparation work shall be measured on a square foot basis complete and in place. All associated costs in connection with modified bitumen built-up roofing shall be considered incidental to that pay item.

4.2 PAYMENT

- B. Modified Bitumen Built-up Roofing shall be made at the Contract Unit Price per square foot.

4.03 PAYMENT ITEMS

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>
0261.127	Modified Bitumen Built-up Roofing	SF

END OF SECTION